

Modelling of a 50 kA REBCO Conductor with Multi-strand Made by Twisted Stacked Tapes

A 50 kA REBCO cable-in-conduit conductor (CICC) based on the Twisted-Stacked-Tape-cable (TSTC) concept is being developed in Swiss Plasma Center (SPC) for DEMO central solenoid. The conductor contains 12 or 13 strands, which is composed of a soldered stack of REBCO tapes encased with copper profile, and a copper core in center.

In this paper, a multi-strand model is implemented in THEA code to model the REBCO CICC with 12 homogeneous superconducting strands. This model includes the isotropic critical current density (J_c) of REBCO tape as well as the inter-strand current sharing and heat transfer. Quench behavior of the conductor is simulated and compared with result by homogeneous 1-D model. The strand-jacket thermal resistance, which was proved an important parameter for quench behavior of such conductor, is measured on triplet dummy. Furthermore, the feasibility of the homogeneous strand assumption is also studied.

Primary author: Mr KANG, Rui (University of Science and Technology of China, Department of Engineering and Applied Physics)

Co-authors: UGLIETTI, Davide; SEDLAK, Kamil (EPFL Lausanne); WESCHE, Rainer (EPFL); BRUZZONE, Pierluigi (EPFL-SPC); SONG, Yuntao (Institute of Plasma Physics, Chinese Academy of Sciences)

Presenter: Mr KANG, Rui (University of Science and Technology of China, Department of Engineering and Applied Physics)